Exploring the World Inside US Prisons for Safety, Health, and Isolation*

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This study replicates and extends research on prison safety, health, and COVID-19 impact, finding significant disparities in incarceration rates between black and white individuals, particularly among those with lower education levels. The findings highlight the enduring issue of mass incarceration in the United States and emphasize the urgent need for comprehensive strategies to address inequalities within the criminal justice system. Understanding these disparities is critical for promoting a more equitable society and enhancing outcomes for marginalized populations.

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1 Introduction

This paper delves into the profound impacts of prisons on safety and health for incarcerated individuals, shedding light on an often overlooked facet of society compared to institutions like schools or hospitals. Focusing on the United States, where the concept of "mass incarceration" looms large, we observe a staggering increase in the prison population since the 1970s, despite a slight decline in recent years. Notably, Black men with limited education face disproportionate rates of incarceration, reflecting systemic inequalities in the justice system. The study examines various aspects of incarceration, including its effects on crime rates, labor markets, and family dynamics, revealing persistent challenges in prisoner rehabilitation and societal reintegration.

Furthermore, this paper offers a unique perspective on US penal institutions as 'total institutions,' where inmates experience stringent control and minimal autonomy, leading to isolation and restricted freedom. Key issues such as mass incarceration, the COVID-19 pandemic, violence, health challenges, and the harsh realities of solitary confinement are explored, with a focus on the high prevalence of COVID-19 cases among prisoners. Global comparisons of mass incarceration trends across 20 countries provide insights into the broader context of prison systems worldwide.

By comprehensively understanding the dynamics within prisons, this paper aims to contribute to the discourse on mass incarceration and advocate for positive reforms. Additionally, the paper replicates and builds upon Bruce Western's findings.Data cleaning and analysis were conducted using the open-source statistical programming language `R`(R Core Team 2022), leveraging functionalities from the `tidyverse`(Wickham et al. 2019) `ggplot2`(Wickham 2016),`dplyr`(Wickham et al. 2023),`readr`(Wickham, Hester, and Bryan 2024),`tibble`(Müller and Wickham 2023),`stringr`(Wickham 2023),`haven`(Wickham, Miller, and Smith 2023),`openxlsx`(Walker 2022),`janitor`(Firke 2023),`knitr`(Xie 2023). The detailed procedures for data extraction and cleaning are expounded upon in the subsequent subsections(Section 2).

2 Data

2.1 Source

The paper used for replication is Inside the Box: Safety, Health, and Isolation in Prison (Western (2021)), which mainly analyzes the impact of prisons on safety and health, and specifically includes data from the new coronavirus pandemic.

Sourcebook of Criminal Justice Statistics
Bureau of Justice Statistics Report
Jail Inmates in 2018, U.S. Population FRED Data
World Prison Population Data
Western B. and Pettit B data
Survey of Inmates of States Correctional Facilities (1986, 1991, 1997, 2004)
Survey of Prison Inmates (2016) (Bureau of Justice Statistics 1994, 2004a, 2004b, 2006, 2019, 2021)

2.2 Methodology

All data are not obtained directly through surveys or sampling statistics; rather, they are derived through meticulous processing and calculation based on pre-existing datasets.

2.3 data cleaning and construction

Accurate data cleansing and structuring are paramount in research. Given the extensive and varied raw data analyzed in the original paper Inside the Box: Safety, Health, and Isolation in Prison (Western (2021)) and the lack of detailed explanation regarding data processing methods by the original author, Figures 1, 2, 4, 5, 6, and 7 are derived from processed data provided by the original author, albeit with a distinct focus in visualization. For figure 2, we obtained the updated version of the original data and expanded it by incorporating data from an additional 5 countries to enhance comprehensiveness. Table 1

Table 1: prison rates in 20 countries

country	prison_population_rate
France	109
Iceland	36
Austria	98
United Kingdom: England & Wales	145
Norway	52
Italy	103

Canada	88
Croatia	106
Spain	113
Sweden	82
Germany	67
Finland	51
Netherlands	65
United States of America	531
Belgium	97
Egypt	116
Singapore	156
Japan	36
Denmark	69
Switzerland	73

2.4 Measurement

For Figure 1 The Bureau of Justice Statistics (BJS) conducts thorough data collection and analysis on the populations incarcerated in both state and federal prisons, as well as local jails, across the United States. Utilizing diverse sources such as surveys, administrative records, and inmate censuses, BJS produces precise estimates of the total number of individuals held in correctional facilities. For Figure 4 and Figure 5,original data comes from two prison questionnaires

For example, the sample for the 2004 survey was drawn from two different documents. The primary archive includes a list of 1,549 state prisons from the June 30, 2000, BJS 2000 Census of State and Federal Correctional Facilities. The secondary archive includes 36 prisons open between June 30, 2000, and April 1, 2003. The sampling design required a stratified two-stage selection process. In the initial phase, 14 male and 7 female facilities were identified based on the gender ratio within prisons. The remaining facilities are divided into 16 levels based on geographic region and the male and female population within each prison. The weighting procedure involves assigning each inmate a base weight and three adjustment factors to obtain the final weight for the survey. Data was collected through face-to-face interviews with prisoners using computer-assisted personal interviewing techniques.

3 Result

3.1 Over trend

Mass incarceration, as outlined by Garland (2001), refers to the historical phenomenon characterized by exceptionally high rates of imprisonment, particularly affecting marginalized populations. It signifies the confinement of vast numbers of individuals within prisons, coupled with the enduring legal and financial barriers they encounter upon reintegration into society, as described by Younes (2014).

From 1925 to 1972, the incarceration rate in the United States exhibited a period of relative stability, punctuated by minor fluctuations. However, since the 1970s, the number of inmates in the U.S. has surged dramatically, increasing by over sixfold, as noted by Manza and Uggen (2006: 95). Following its peak in 2007, incarceration rates have seen a slight decline over the past decade. However, they remain approximately five times higher than the average rate observed throughout the 20th century.

This underscores the continued importance of mass incarceration as a pressing issue in the United States. It highlights the need for further research to fully examine its effects on various aspects including health, property ownership and personal growth. Furthermore, understanding its socioeconomic impact and exploring effective rehabilitation and reintegration strategies are important steps to address this multifaceted problem and build a more just and equitable society. Figure 1
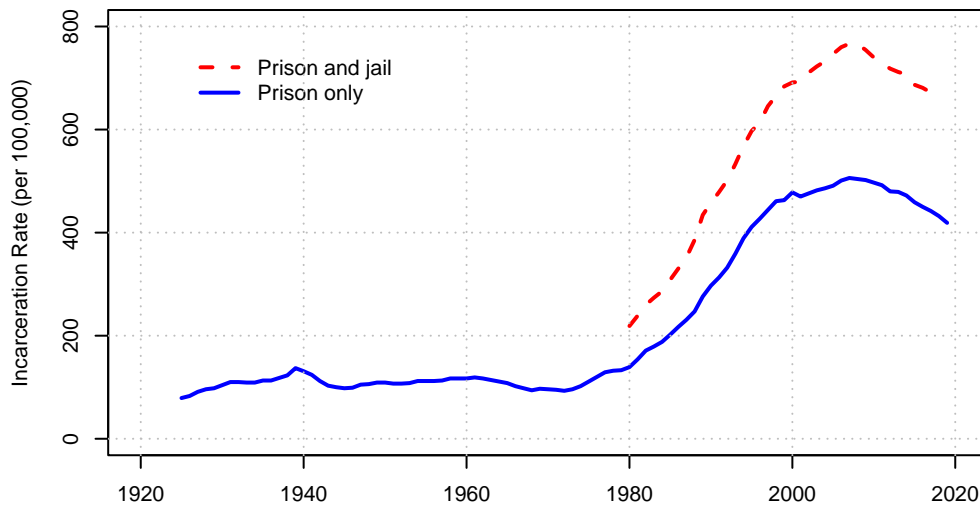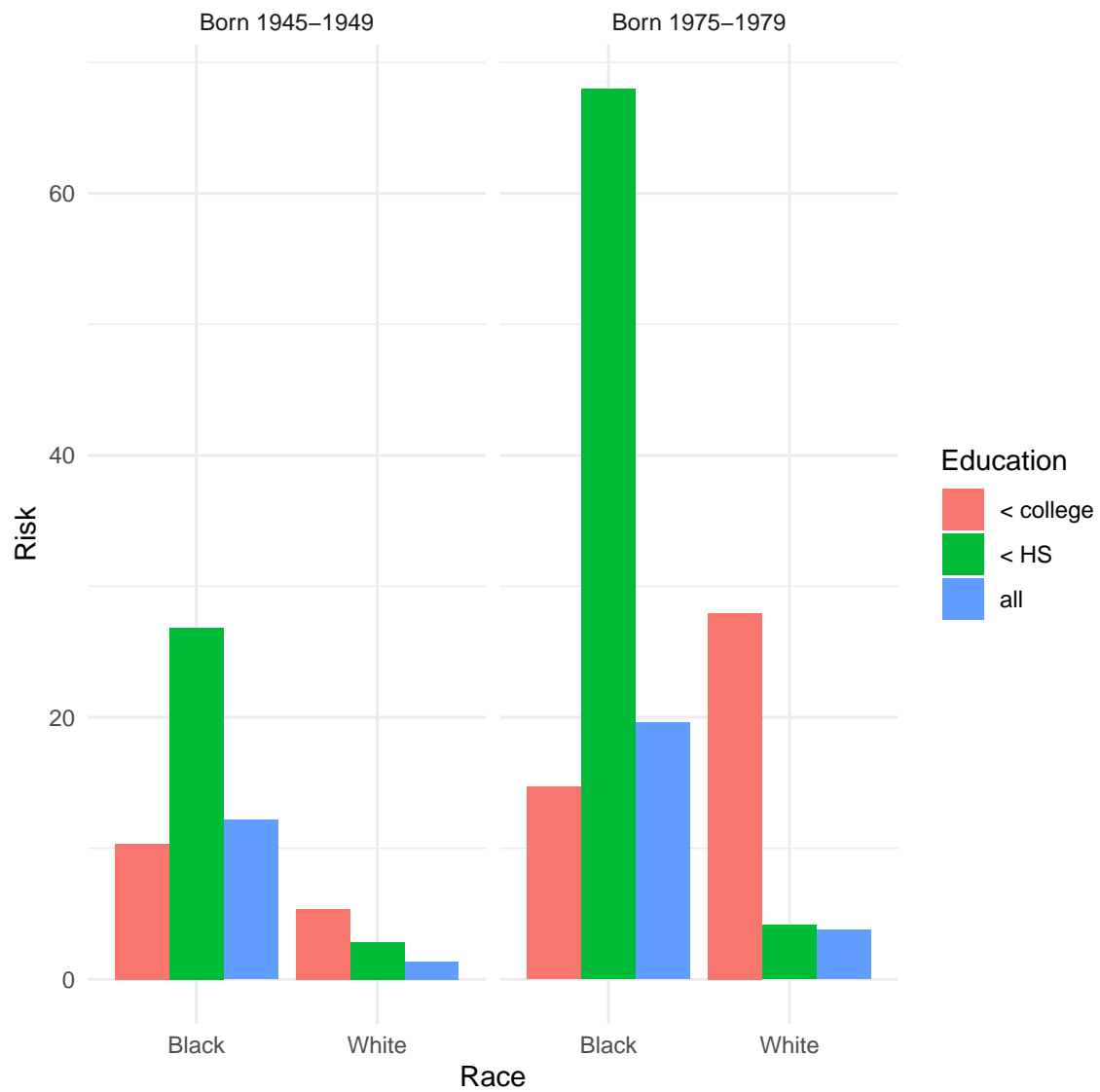

Figure 1: US Incarceration, 1925-2018

Figure 2: Men's cumulative imprisonment risk, by cohort

3.2 Exploring Racial Disparities in Incarceration Trends

Despite extensive discussions surrounding the surge in the U.S. prison population over the last twenty-five years (Pettit and Western (2004)), scant attention has been paid to the evolution of incarceration inequality. Our study delves into sentencing disparities by analyzing the likelihood of incarceration among blacks and whites across varying educational attainment levels. The data(Figure 2) reveals stark contrasts: irrespective of educational achievement, black individuals face significantly higher incarceration rates compared to their white counterparts, particularly among those with less than twelve years of schooling.

3.3 Global Perspectives on Mass Incarceration

In addition to examining the trajectory of incarceration rates within the United States over time, it is equally imperative to conduct horizontal comparisons by scrutinizing incarceration rates across different countries. Such comparisons enable us to discern whether mass incarceration is a global phenomenon or if it manifests as a more acute issue within the United States.

Data regarding prison population rates per 100,000 of the national population is accessible through the online public data platform World Prison Brief. This resource provides updated country information on a monthly basis, drawing primarily from governmental or other authoritative sources, thereby ensuring the data's timeliness and reliability.

After acquiring the most recent data, we encountered complexity in processing the information for over 200 countries. Consequently, we streamlined our analysis by selecting a subset of 20 representative countries. Subsequently, we utilized this refined dataset to generate informative charts and visualizations(Figure 3)

In addition to the United States, which serves as the primary focus of our research, the selected subset of 19 countries encompasses a diverse range of geographical locations across all seven continents. These countries represent various levels of development, including developed nations, developing regions, and areas classified as less economically developed. Moreover, the chosen countries vary in terms of land area, with some comparable in size to the United States, such as Canada and, to a lesser extent, Iceland. This diverse selection ensures a comprehensive analysis that accounts for a wide spectrum of geographic, developmental, and size-related factors.

It can be readily inferred from graphical representations and pertinent research that the United States holds the title of the world's foremost incarcerator, detaining a higher percentage of its population than any other nation.

It is noteworthy that the incarceration rates (per 100,000) observed in the other 19 countries typically hover around 100. In stark contrast, the United States exhibits an incarceration

rate exceeding four times this average. This significant disparity underscores the exceptional nature of the U.S. incarceration system compared to its international counterparts.
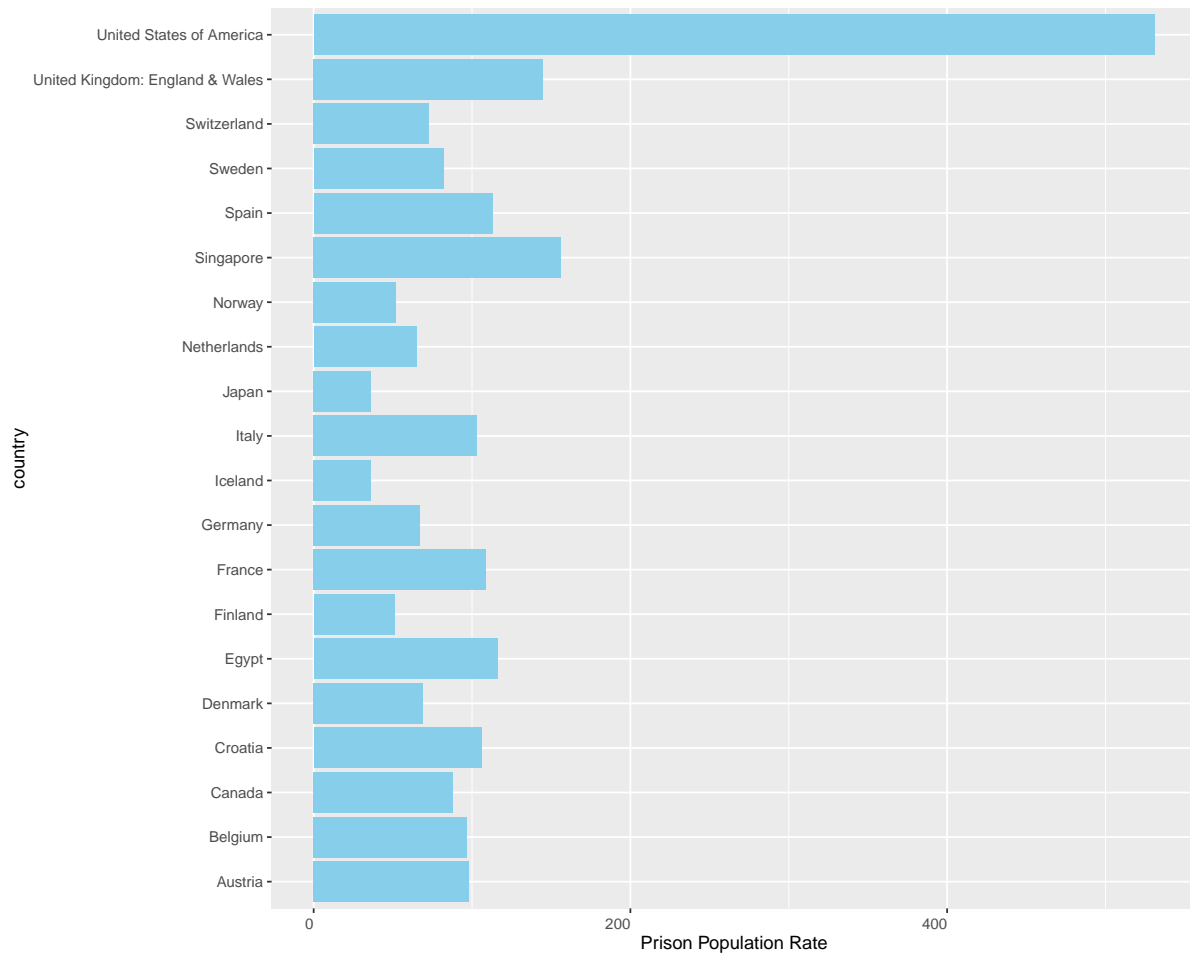

Figure 3: Prison Population Rate by Country

4 Discussion

4.1 rehabilitating

Rehabilitation refers to a series of interventions aimed at enhancing functioning and diminishing disability in individuals with health conditions, taking into account their interactions with the environment.Academics studying mass incarceration identify the 1970s as a critical juncture in U.S. penal history, characterized by a transition towards stricter punitive measures and a widespread belief that traditional rehabilitation methods were ineffective(Phelps (2011)).

The initial segment investigates prisoner engagement in rehabilitation initiatives across the United States. Figure 4 delineates four program categories (drug rehabilitation, education, job training, employment) and four regional divisions (Northeast, Midwest, South, West). Preliminary findings indicate that participation rates in the Northeast region tend to surpass those in the other three regions overall, whereas participation in the West region appears consistently lower across all four projects. Participation levels in the Southern region exhibit significant year-to-year fluctuations.

The processed data only provides a rough division of the United States into four major regions based on geographical location, limiting the possibility of conducting more detailed data analysis. Unfortunately, the original author only briefly mentioned the data source without elaborating on the data processing methods. Moreover, due to the large size of the original dataset, extracting more detailed variable classification data proved to be challenging.
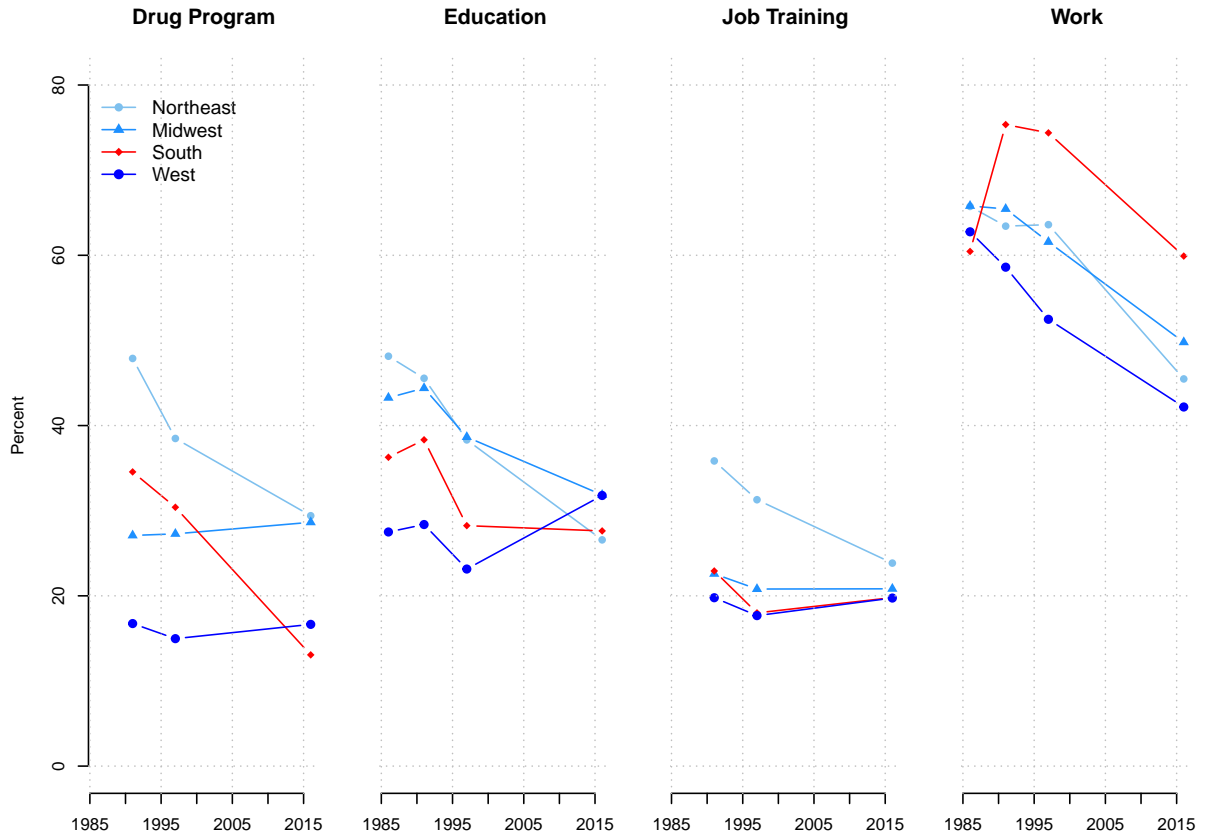

Figure 4: Enrollment in Drug, Education, Job Training Programs, and Work Assignment, State Prisoners, by Region_admit

The original data table exclusively focused on a subset of admitted individuals for the analysis of the American Prison Rehabilitation Program. Consequently, we opted to select the not admitted portion of the dataset to create similar charts for comparative analysis. Figure 5

Figure 5: Enrollment in Drug, Education, Job Training Programs, and Work Assignment, State Prisoners, by Region_not_admit

illustrates that there is minimal disparity between the two groups regarding participation in drug rehabilitation and employment programs. However, the non-admitted group exhibits higher participation rates in education and vocational training initiatives.

There is increasing evidence suggesting that in certain instances, incarceration can facilitate prisoners' reintegration into society (Arbour, Lacroix, and Marchand (2021)). Therefore, it may be beneficial for the U.S. government to implement additional programs aimed at assisting prisoners in readjusting to society. This approach not only reflects a commitment to humanistic values but also serves to bolster social security and foster broader societal development.

4.2 Cumulative COVID-19 Case Rates among Those in Prison and General Population

The closed and densely populated environment within prisons creates ideal conditions for the proliferation of large infectious diseases. The data stemming from the recent COVID-19 pandemic serves as a poignant illustration of this perspective, offering detailed insights into the heightened vulnerability of incarcerated populations to the rapid transmission and severe impact of contagious illnesses.

The prison population stands out as a high-risk demographic group during the coronavirus disease 2019 (COVID-19) pandemic. In addition to residing in environments that are inherently challenging for practicing "social distancing," individuals within prisons often exhibit advanced age and possess multiple comorbidities. These characteristics are reflective of punitive policies that are discriminatory in nature and implemented worldwide (Elbek (2020)).

When comparing the overall new coronavirus infection rate among the American population with the new coronavirus infection rate among prison inmates, a clear trend emerges according to the chart (Figure 6). In the majority of states in the United States, the data pertaining to infection rates among prison inmates surpasses that of the general population by a significant margin.

The significant number of individuals held in incarceration across the United States, combined with prevalent environmental conditions within correctional facilities—such as overcrowding, limited sanitation, inadequate healthcare access, subpar ventilation, and challenges in maintaining social distancing—have presented distinct and substantial challenges and risks for both incarcerated individuals and staff members throughout the pandemic (Nowotny et al. (2020)).

Novisky, Narvey, and Semenza (2020) indicates that the implementation of varied epidemic prevention policies across different states in the United States, alongside differences in the infrastructure of state prisons, has resulted in significant disparities in prisoner infection rates.

In addition to replicating the original data, we have incorporated a comparison of the COVID-19 infection rate among prison staff with the overall U.S. COVID-19 infection rate. According to the figure(Figure 7), the infection rate among prison staff surpasses the overall infection

rate but remains lower than the new coronavirus infection rate among incarcerated individuals, positioning it roughly in the middle between the two. This observation underscores the vulnerable position of prisoners within correctional facilities during the pandemic.

4.3 Weaknesses

4.3.1 Bias in Data Analysis

On one hand, it's noteworthy that a considerable portion of data regarding U.S. prisons exclusively pertains to men, leading to the phenomenon referred to as "big dick data." This term underscores the prevalence of male-dominated datasets, which not only underscores systemic bias and marginalization, particularly towards women but also sheds light on existing power dynamics. The absence or marginalization of women in these datasets not only mirrors prevailing power structures but also perpetuates gender-based biases and stereotypes. Such gender disparity distorts our comprehension of reality, reinforces harmful stereotypes and inequalities, and presents substantial hurdles to data-driven decision-making (D'Ignazio and Klein (2020)).

On the other hand, when examining racial data, it tends to be categorized broadly into whites and blacks. This practice not only reinforces the binary opposition between these two racial groups in the United States but also overlooks the experiences of other ethnic minorities.

4.3.2 Measurement error

Utilizing data from various origins, a practice known as data fusion or integration, introduces complexities and hurdles that can result in measurement inaccuracies. Each dataset carries its unique biases, constraints, and inaccuracies stemming from variations in data collection methods, sampling approaches, measurement tools, and processing methodologies.

The amalgamation of data from disparate sources often introduces disparities in quality, consistency, and reliability, leading to inconsistencies or inaccuracies in the merged datasets. Moreover, issues like incomplete data, absent values, and misclassification errors can compound measurement inaccuracies.

4.4 future

On the one hand, similar data collection, statistical analysis, and comparative studies of Canadian prisons provide an attractive avenue for gaining insights due to Canada's geographic proximity to the United States and some shared cultural and legal frameworks. This similarity in land area and certain social aspects may allow for more meaningful comparisons and broader conclusions.
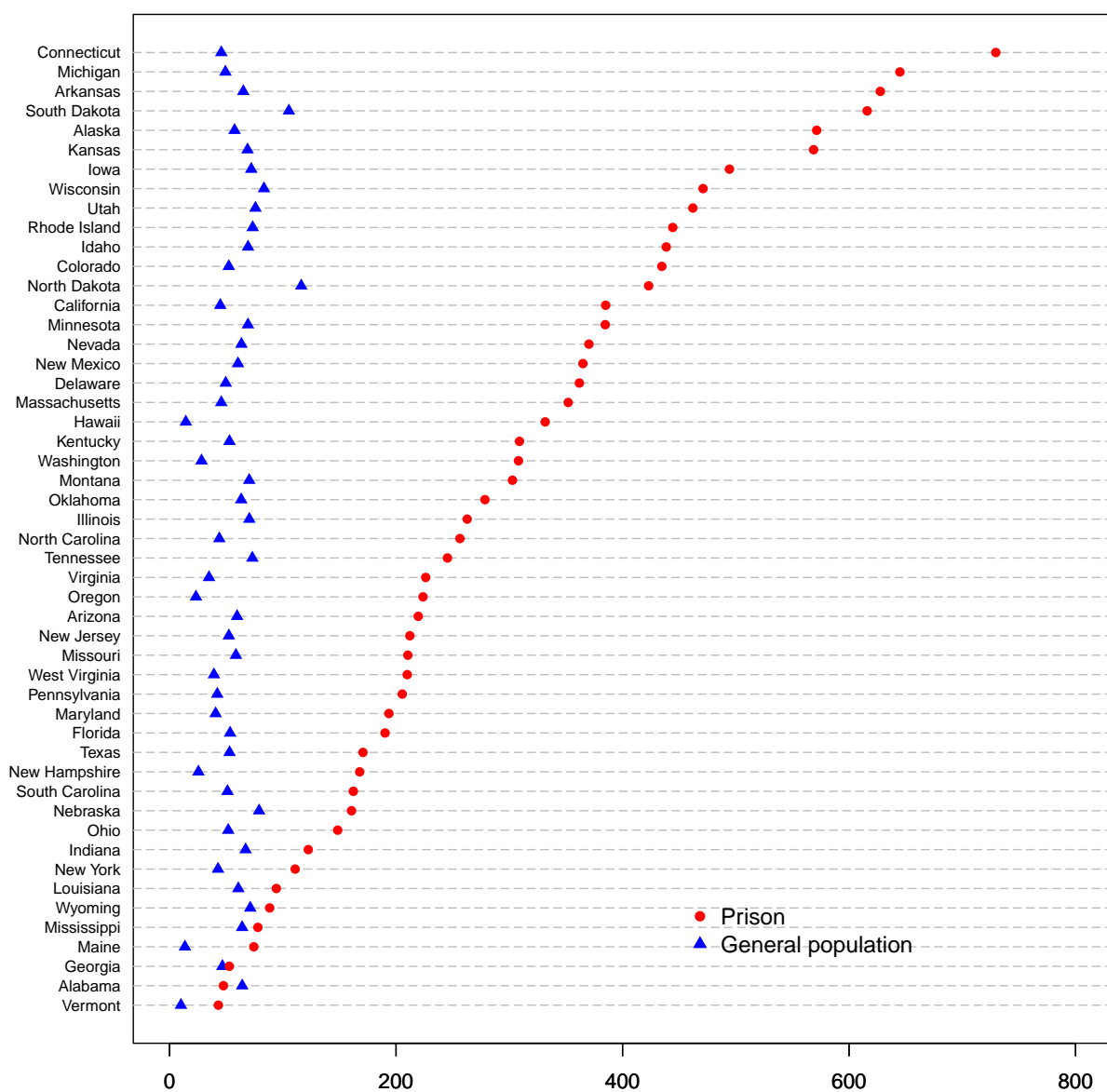
Figure 6: Cumulative COVID-19 Case Rates among Those in Imprisoned persons and General Population, by State
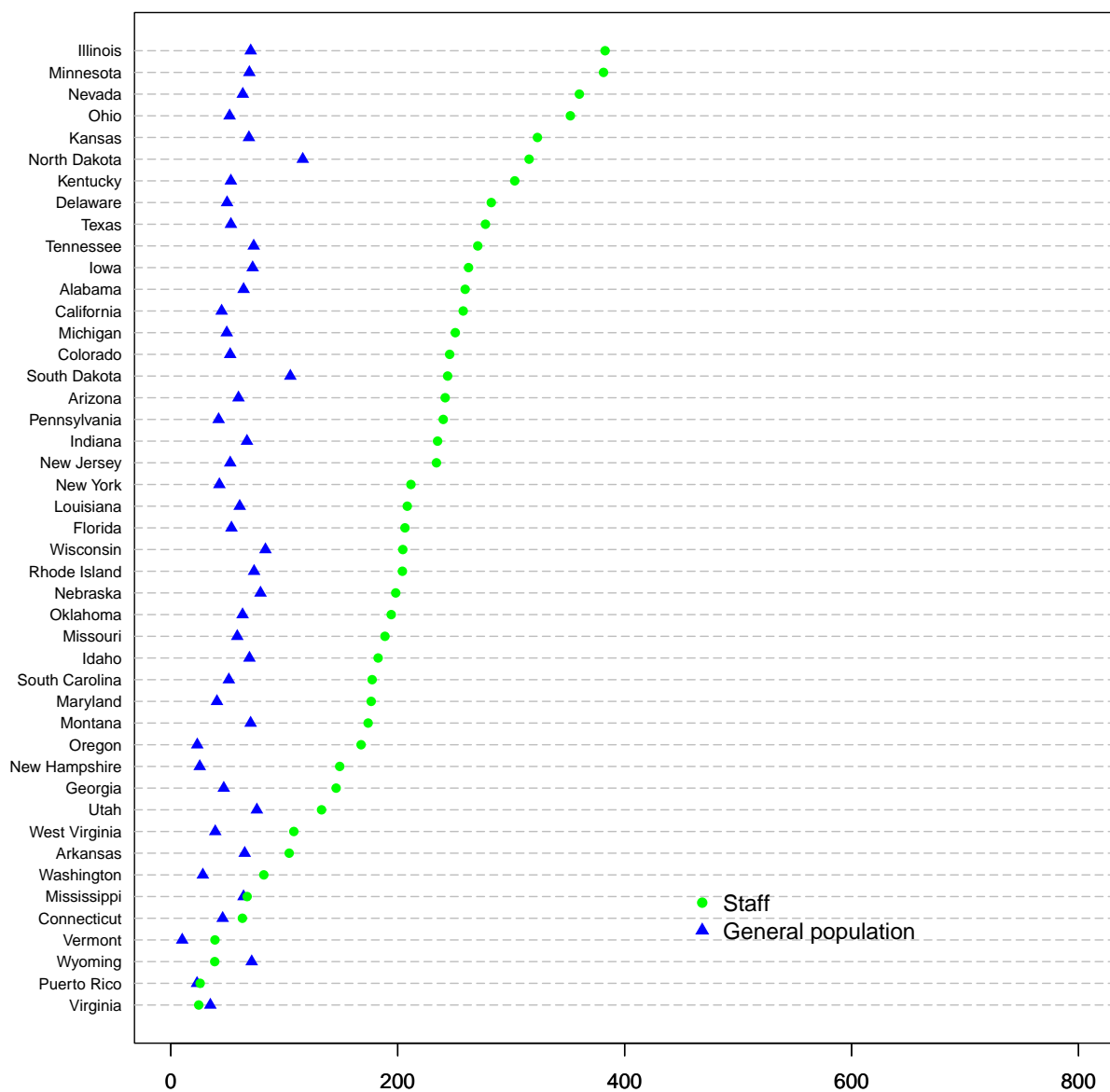
Figure 7: Cumulative COVID-19 Case Rates among Those in Prison Staff and General Population

On the other hand, a comparison of prison data from smaller Nordic countries, represented by Iceland, gives a markedly different context. These countries tend to have very different social norms, legal frameworks, and approaches to criminal justice than North American countries. Factors such as smaller population sizes, different cultural attitudes toward crime and punishment, and alternative approaches to rehabilitation may contribute to contrasting prison data.

Apart from large-scale studies, conducting small controlled experiments could offer valuable insights into the influence of different prison environments on the physical and mental well-being of inmates.

Studying the experiences of prison staff can provide insight into challenges within correctional facilities and facilitate the development of effective policies. Likewise, exploring the impact of incarceration on families can provide greater insight into broader social impacts, including emotional distress and financial stress. Including their voices in research and policy discussions is critical to addressing the complex issues surrounding incarceration and reentry.

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